Claim 41 was objected to on the grounds that the term "resin" does not encompass the monomeric substances recited in the claim. Hawley's Condensed Chemical Dictionary, Thirteenth Edition, 1997, at page 963 defines "resin" as "A semisolid or solid complex amorphous mix of organic compounds." It is therefore respectfully submitted that monomeric substances can properly be encompassed by the term "resin," and that the objection should therefore be withdrawn.

Claim 16 was rejected as being rendered indefinite by the language "at least some." It is believed that with the amendment of Claim 16, this rejection can be withdrawn.

The claims were rejected on the grounds of obviousness from Offill, in view of Rosemund et al. and Muller et al. The Examiner indicated by telephone on June 2, 2000, that the claims rejected on these grounds were Claims 16-25, 27-43, and 45-46.

Offill discloses a flexible liner forming a mechanical lock with a carrier material, and forming bond with the surface of a substrate conduit. However, as is clearly set forth at Column 7, lines 13-17 of Offill, the carrier does not and should not bond with the flexible liner, so that the only mechanism retaining the flexible liner against the carrier is the mechanical lock formed between the outwardly projecting members and the carrier. Claim 16 has been amended to recite "said fifth region comprising a high tensile strength thermoplastic material having some of said reactive resin impregnated into said thermoplastic material proximate said fourth region, and wherein said second, third, fourth and fifth regions are chemically bonded together in a catalyzed reaction; and wherein said second, third, and fourth regions have sufficient shear

strength to transmit loads on said first region to said fifth region, whereby said high tensile strength thermoplastic material of said fifth region reinforces said load bearing structure." Claim 28 similarly has been amended to recite, "wherein said high tensile strength thermoplastic material and thermoset material are bonded together and to said substrate with sufficient shear strength to transmit and distribute loads on said substrate to said high tensile strength thermoplastic material to improve the structural load bearing strength of said load bearing structure." Claim 36 similarly has been amended to recite, "wherein said thermoplastic material and thermosetting material are bonded together and to said substrate surface with sufficient shear strength to transmit and distribute loads on said substrate surface to said high tensile strength semi-rigid thermoplastic material to reinforce said conduit." It is respectfully submitted that Offill does not teach or disclose forming a chemical bond between a carrier material and a liner, and that Offill does not teach or disclose bonding such a carrier material and a high tensile strength liner together with sufficient shear strength to transmit and distribute loads on a substrate conduit to the high tensile strength liner to reinforce the substrate conduit.

Rosemund et al. teaches thermal bonding of polyurethane foam compositions to various substrates by the addition of various modifiers, but does not teach or disclose chemically bonding of a thermoset material to a thermoplastic material via an intermediate catalyzed reactive resin as is claimed. Rosemund also does not teach or disclose bonding polyurethane compositions and a high tensile strength liner together with sufficient shear strength to transmit and distribute loads on a substrate conduit to the high tensile strength liner to improve the

structural load bearing strength of the substrate conduit.

Muller et al. was cited as teaching the presoaking of a polymeric liner with a resin before placing it into a pipe. In Muller et al., a lining tube is formed with an outer layer and an inner layer made from fiber fleece and a barrier layer that is impermeable to fluid, located between the inner layer and the outer layer. While the inner layer can be soaked with a polyester resin, the inclusion of a barrier layer would prevent chemical bonding of the outer layer to the inner layer. Muller et al. also does not teach or disclose bonding polyurethane compositions and a high tensile strength liner together with sufficient shear strength to transmit and distribute loads on a substrate conduit to the high tensile strength liner to reinforce the substrate conduit.

The Examiner's attention is directed to the specification at page 6, lines 7-17, noting that in conventional conduit restoration methods, the lining added does not have any connection to the material between the lining and the conduit except by mechanical locks , and that the tensile strength of the material between the lining and the conduit is relatively low. Commonly, thermoplastic liners also do not have a high tensile strength. As is pointed out in the specification at page 12, lines 27-29, the thermoplastic sheet liner of the invention is selected to provide a high resistance to tensile stresses, indicated generally by the bi-directional arrow 52 as is illustrated in FIG. 2. Further, as is discussed in the specification from page 22, line 15 to page 23, line 15, the thermoplastic sheet liner will have a substantial tensile strength, and that the stresses impinging from the outside top surface of the substrate conduit will be distributed and transferred to the thermoplastic sheet, which will bear substantial tensile stresses at the inside

crown or soffit area of the conduit. In this manner, the stresses on the conduit are substantially reduced. It should be recognized that the double layer, sandwich construction of the conduit-thermoset material-thermoplastic liner composite of the invention can not only be viewed as performing like an "I" beam, in which the thermoset material takes the part of the cross-member holding the conduit and thermoplastic liner together to bear a compressive load, but also can be viewed as a double arch, sandwich composite construction, having differential moments of inertia due to being spaced apart. Resistance of the double arch, sandwich construction is provided not only by the compressive load bearing of the components, but also by the shear strength of the intermediate layer of thermoset material chemically bonded between the conduit surface and the thermoplastic sheet liner. As discussed further in the specification at page 25, lines 18-24, forces or stresses that would tend to separate the thermoplastic sheet liner from the substrate conduit must shear the thermoplastic material away from the thermoset region. In this manner, the composite structure of the invention significantly permits the high tensile strength thermoplastic sheet liner to substantially strengthen the load bearing capacity of a conduit being repaired.

It is therefore respectfully submitted that none of the references cited, alone or in combination, teach or suggest chemically bonding of a thermoset material to a thermoplastic material via an intermediate reactive resin as is claimed, and do not teach or disclose bonding polyurethane compositions and a high tensile strength liner together with sufficient shear strength to transmit compressive loads on a substrate conduit to the high tensile strength liner to

improve the structural load bearing strength of the substrate conduit as is claimed, so that the rejection of Claims 16-25, 27-43, and 45-46 on the grounds of obviousness from Offill, in view of Rosemund et al. and Muller et al. should be withdrawn.

Claims 26 and 44 were also rejected under 35 U.S.C. 103(a) on the grounds of obviousness from Offill, in view of Rosemund et al., Muller et al. , and Ranney et al., which was cited as showing silane primers blended with polyurethane sealants. Claim 28 also recites the thermoset material including silane. However, it is respectfully submitted that Ranney et al. also does not teach or disclose chemically bonding of a thermoset material to a thermoplastic material via a catalyzed intermediate reactive resin as is claimed, and does not teach or disclose bonding polyurethane compositions and a high tensile strength liner together with sufficient shear strength to transmit compressive loads on a substrate conduit to the high tensile strength liner to improve the structural load bearing strength of the substrate conduit as is claimed, so that the rejection of Claims 26 and 44 on the grounds of obviousness from Offill, in view of Rosemund et al., Muller et al., and Ranney et al. should be withdrawn.

In light of the foregoing, it is respectfully submitted that the application should now be in a condition for allowance, and an early favorable action in this regard is respectfully requested.

Respectfully submitted,

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